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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/062,790	02/01/2002	Shreeram V. Deshpande	31937	3371

3

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EXAMINER
ASHTON, ROSEMARY E

ART UNIT	PAPER NUMBER
1752	

DATE MAILED: 04/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/062,790	Applicant(s) DESHPANDE, SHREERAM V.	
	Examiner Rosemary E. Ashton	Art Unit 1752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

RA 4/28/03

1)☒ Responsive to communication(s) filed on MAY 1, 2002

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-37 and 39-44* is/are rejected.

7)☒ Claim(s) *38* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. With respect to the following rejections: the examiner notes the formula in claim 1 has a line that page 2 of the specification states is the polymer backbone. Limiting the line to the polymer backbone would mean there is no functional group between the polymer backbone and the –CR2CR2OC(O)X group. However, the examples in the specification are directed to an epoxy novolac backbone having the formula -phenyl-OCH_2epoxide wherein only the phenyl group is in the backbone and the -OCH_2epoxide group is pendant from the phenyl ring. Thus, there may be a functional group between the backbone and the -CR2CR2OC(O)X group, specifically in the epoxy novolac it is the OCH_2 group.

The polymer in the claims has been treated as reading on formula 1 wherein there may be functional groups between the backbone and the -CR2CR2OC(O)X group.

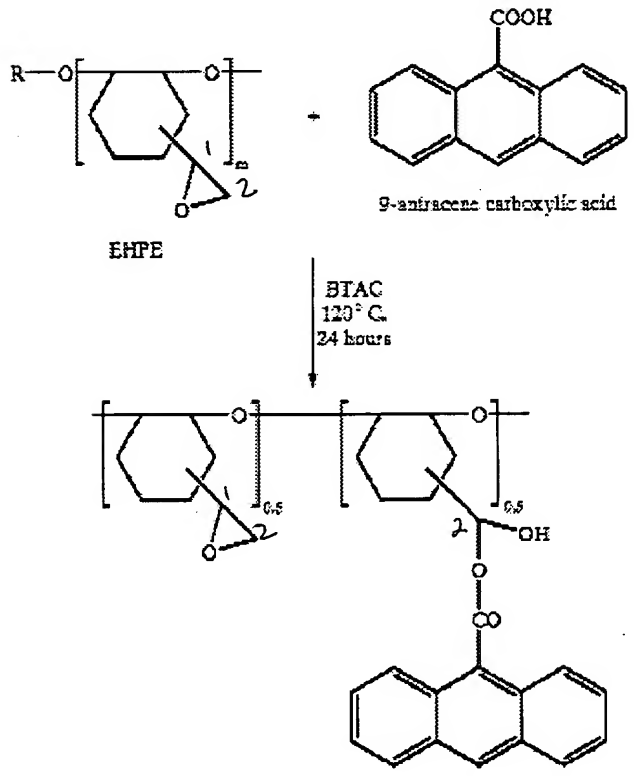
Claim Rejections - 35 USC § 102

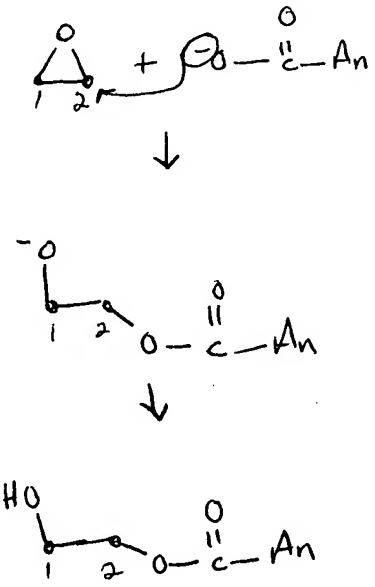
2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1,2,4-8,10-19,21-31,33,35,39-43 rejected under 35 U.S.C. 102(e) as being anticipated by Puligadda U.S. publication US 2003/0004283 for serial number 09/874,783 filed June 5, 2001.

Puligadda teaches an antireflective composition (ARC) comprising a polymer have the formula below (example 1). The final product polymer below is incorrect in that it is missing a carbon atom from the epoxide when the carboxylic acid opens the epoxide ring and binds to the carbon atom of the epoxide ring as shown below.

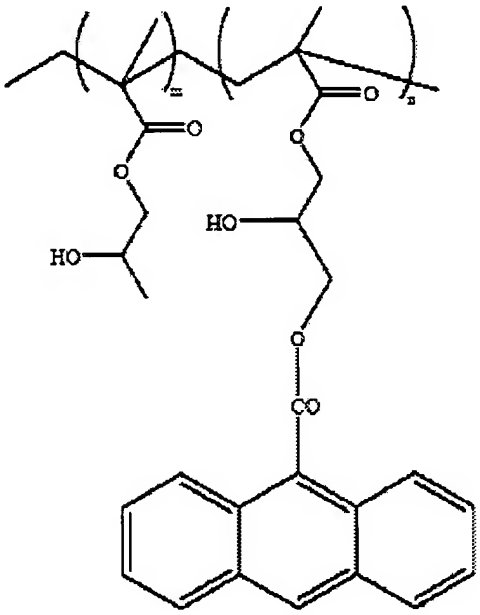




The polymer is a polyether formed by reacting epoxy groups with the acid of the chromophore such as the above anthracene compound. The molecular weight of the polymer is 1,000 to 15,000 as shown in section 10, the backbone is an acrylic group and the weight % of X

is 35 % as in claim 6. The reaction is done in the presence of the catalyst BTAC which is benzyltriethylammonium chloride at 120 °C as shown in sections 24 and 31.

Example 2 has the polymer below and is an acrylic resin having a CH_2 between the polymer acrylic backbone and the $-CH(OH)CH_2OC(O)An$ group.



The ARC has a crosslinking agent, such as melamine which crosslinks the hydroxyl groups of the chromophore monomer. As shown in Example 2, Cymel 303 is a melamine resin which undergoes reaction with the hydroxyl group of the anthracene monomer as in claim 18. The composition also contains the catalyst p-toluenesulfonic acid and PGMEA as claimed. The composition is spin-coated on a silicon wafer substrate and cured at 205 °C. In section 35 the composition is also coated on a hole, which Puligadda calls a trench, as in claim 29.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Puligadda cited above.

As shown in Figure 1 and section 37 Puligadda teaches a method of coating the cured ARC with a photoresist, exposing and developing the photoresist, however, it does not teach etching the developed photoresist. The examiner takes official notice that etching of the photoresist is well known in the art and that it would have been obvious to one of ordinary skill in the art to etch the photoresist because such a procedure is well known in the art of photolithography.

Claim Rejections - 35 USC § 102

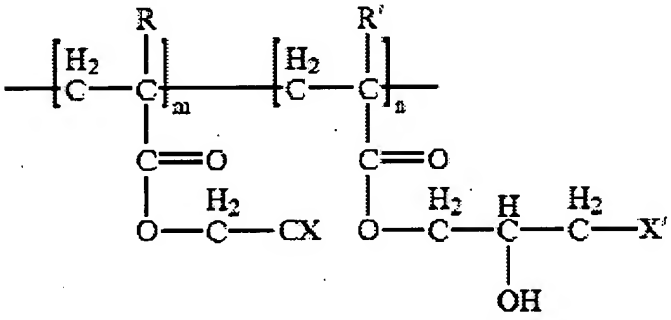
6. Claim 37 is rejected under 35 U.S.C. 102(b) as being anticipated by Holmes et al U.S. patent no. 6,110,653.

Holmes teaches a combination of a substrate, a cured ARC comprising a polymer and a divinyl ether and a photoresist (Example 3, lines 5-23 and claim 1).

7. Claims 1,2,4,7,8,10,13,14,16-19,21,24,25,27,28,30-33,35-37,39-43 are rejected under 35 U.S.C. 102(e) as being anticipated by Enomoto et al U.S. patent no. 6,495,305.

Enomoto teaches an antireflective composition (ARC) comprising a polymer have the formula below (claim 8) wherein X is a chromophore of the following compounds as stated in claim 9.

9. The composition of claim **8**, wherein X' is a light attenuating compound selected from the group consisting of naphthoic acid, anthracene, naphthalene, benzene, chalcone, phthalimides, pamoic acid, acridine, azo compounds, dibenzofuran, and derivatives thereof.



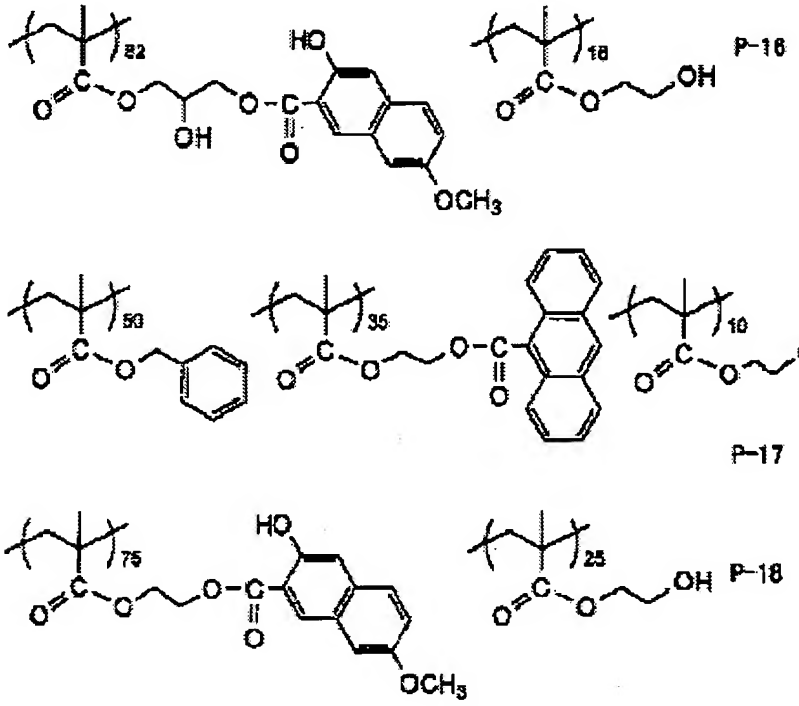
The polymer is an acrylic polymer formed by reacting epoxy groups with the carboxylic acid of the chromophore. The reaction is done in the presence of a catalyst of benzyltriethyl-ammonium chloride as shown in col. 8, lines 7-47.

The ARC has a crosslinking agent such as an aminoplast (col. 2, lines 16-38) and a catalyst of p-toluenesulfonic acid (examples) and a solvent such as PGMEA as claimed (col. 2, lines 1-7). The composition is spin-coated on a silicon wafer substrate and cured at 205 °C (col. 9, lines 1-8).

A photoresist is coated on the cured ARC, exposed, developed and etched (col. 9).

8. Claims 1,2,4,5 are rejected under 35 U.S.C. 102(a) as being anticipated by JP 2001-147538.

The Japanese patent teaches acrylic naphthalene polymers P-16 and P-18 shown below that read on the above claims (page 8). P-16 has a molecular weight of 9100 and P-18 has a molecular weight of 6900 as in claim 5 (page 23, table 2).

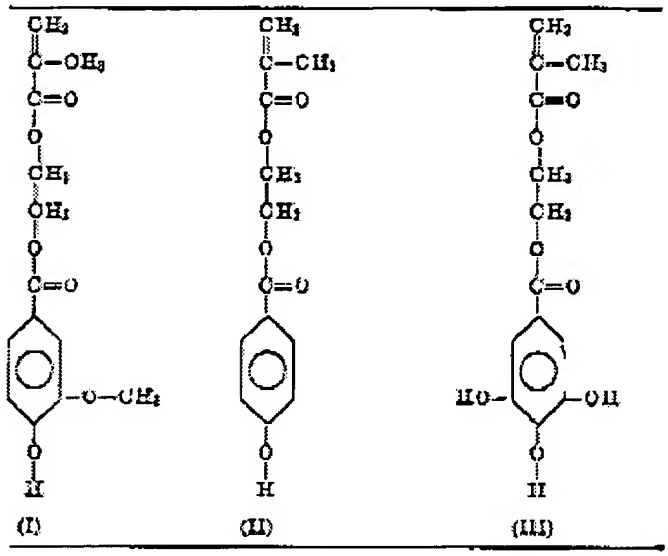


9. Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Bowen U.S. patent no. 3,635,889.

The patent teaches acrylic phenol polymers in Table 1 shown below that read on the above claims.

TABLE 1

Condensation-reaction products of 2-hydroxyethylmethacrylate with vanillic acid (I), with p-hydrobenzoic acid (II), and with gallic acid (III), respectively



10. Claims 1,2,4 are rejected under 35 U.S.C. 102(b) as being anticipated by Kobayashi U.S. patent no. 6,132,935.

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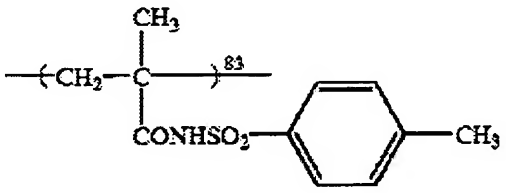
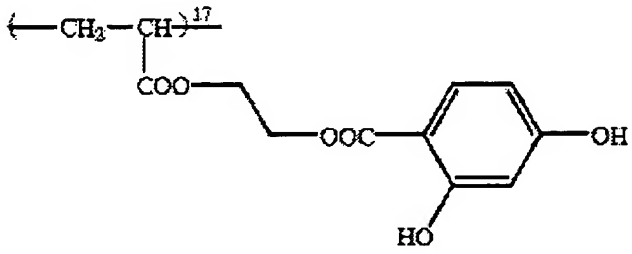
The patent teaches acrylic phenol polymers ~~in Table 1~~ such as example 15 shown below that read on the above claims (col. 24-25).

EXAMPLE 15

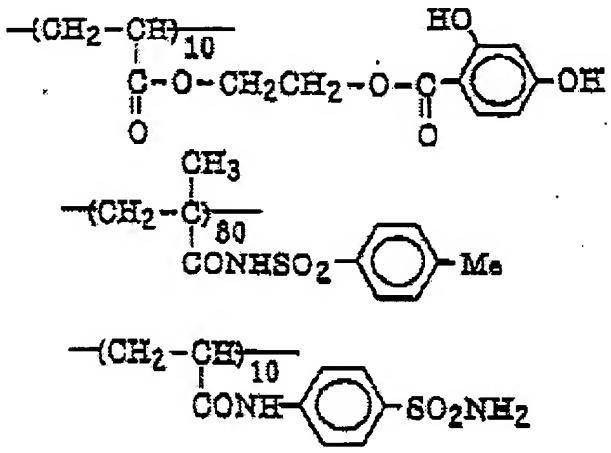




11. Claims 1,2,4,5 are rejected under 35 U.S.C. 102(b) as being anticipated by DE 19520625.

The German patent teaches acrylic phenol polymers 4-15 (polymer 15 shown below) that read on the above claims (pages 20-23). The polymer has a molecular weight of 57,000 as in claim 5.

15 (Synthese des Polymers Nr. 12)

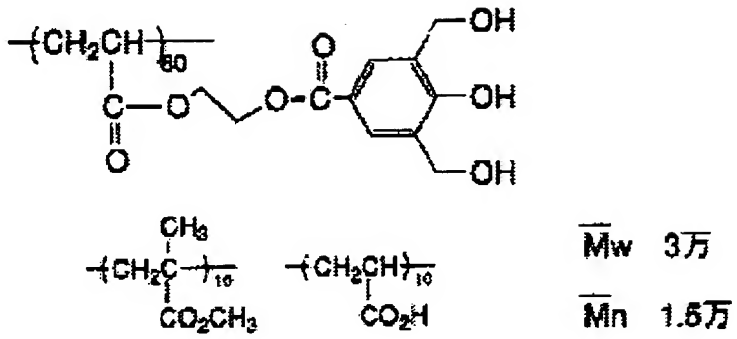


57 000

12. Claims 1,2,4,5 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 11-102071.

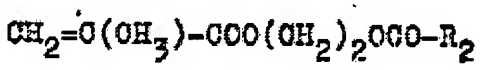
The Japanese patent teaches acrylic phenol polymers A-3,14,27,34,40 and BP-4,13 that read on the above claims (pages 4,5,7-10,13). The polymer BP-4 shown below has a molecular weight of 30,000 as in claim 5 (the Table on page 42).

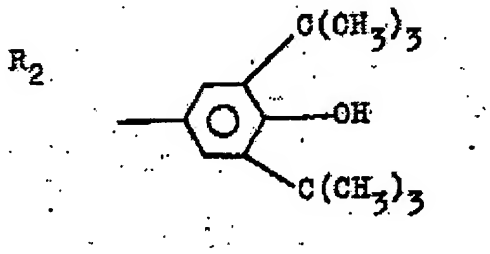
(BP - 4)



13. Claims 1,2,4 are rejected under 35 U.S.C. 102(b) as being anticipated by DE 1931452.

The German patent teaches the acrylic phenol polymer shown below that reads on the above claims (pages 9-10).





Claim Rejections - 35 USC § 103

14. Claims 6,12,23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Enomoto et al cited above.

As noted above Enomoto teaches the invention of the instant application, however, it does not teach the weight % of the chromophore X with respect to 100 weight % of the polymer.

It would have been obvious to one of ordinary skill in the art to vary the amount of chromophore in the polymer through routine experimentation so as to obtain an antireflective composition because optimization of reagent concentrations is well known in the art. As stated in section 2144.05(b) of the MPEP:

> "Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller , 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955).

15. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over each one of JP 2001-147538, Kobayashi, DE 19520625 or JP 11-102071 cited above.

The prior art of JP 2001-147538, Kobayashi, DE 19520625 and JP 11-102071 teach polymers meeting the limitations of the claimed polymer, however, they do not teach the weight % of the chromophore X with respect to 100 weight % of the polymer.

It would have been obvious to one of ordinary skill in the art to vary the amount of chromophore in the polymer through routine experimentation so as to obtain a resist laminate (JP 2001-147538), a photocopying composition (DE 19520625) or a photosensitive recording material (Kobayashi and JP 11-102071) because optimization of reagent concentrations is well known in the art. As stated in section 2144.05(b) of the MPEP:

> "Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller , 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955).

Allowable Subject Matter

16. Claim 38 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. The following is a statement of reasons for the indication of allowable subject matter: The prior art does not teach using a crosslinker of trimethylolpropane trivinyl ether .

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rosemary E. Ashton whose telephone number is 308-2057. The examiner works a flexible work schedule and can normally be reached M-F between 10:00 am and 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet Baxter can be reached on 308-2303. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Rosemary E. Ashton
Primary Examiner
Art Unit 1752

rea
April 28, 2003

ROSEMARY ASHTON
PRIMARY EXAMINER